REMARKS

This case has been carefully reviewed and analyzed in view of the Official Action dated 27 February 2003. Responsive to the rejections made in the Official Action, Claims 1 and 7 have been amended to clarify the combination of elements which form the invention of the subject Patent Application. Additionally, Claims 2-6 and 8-9 have been cancelled by this Amendment.

In the Official Action, the Examiner objected to the drawings under 37 C.F.R. § 1.83(a) because they failed to show the width of the inner dent of the concave end being larger than the mount of the concave end, or the width of the inner dent of the concave end being smaller than or equal to the mount of the concave end.

It is respectfully submitted that Claims 4 and 5 have been cancelled by this Amendment, thereby removing the structural elements not shown in the drawings from the Claims and thereby obviating the need for drawing corrections.

In the Official Action, the Examiner rejected Claims 1-9 under 35 U.S.C. § 112, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention. The Examiner indicated that Claim 1 included language directed to the method of forming the coils of the stator winding, which the Examiner stated was not germane to the issue of patentability of the device itself. Accordingly, Claim 1 has been amended to correct the language thereof. It is now

believed that Claims 1 and 7 particularly point out and distinctly claim the subject matter that Applicant regards as the invention.

In the Official Action, the Examiner rejected Claim 1 under 35 U.S.C. § 103 as being unpatentable over Forbes et al., U.S. Patent 4,712,035, in view of Nitta et al., U.S. Patent 6,265,804 and Wendt et al., U.S. Patent 4,131,693. The Examiner stated that the Forbes et al. reference disclosed an inner stator structure having a stator ring and a plurality of stator teeth, each of the stator teeth having an insulating stage. The Examiner then admitted that the reference failed to disclose the ring being divided into a plurality of equal units, each unit having a concave end and a convex end for assembling adjacent units into an annulus shape, and wherein the stator structure is separated into a plurality of equal units, and the windings being made of lacquered copper wire. However, the Examiner referred to the Nitta et al. reference as disclosing a motor with a stator ring divided into a plurality of equal units, each unit having dovetail connecting ends for assembling adjacent stator units together. The Examiner next concluded that it would have been obvious to one skilled in the art at the time the invention was made to modify the Forbes et al. motor by embodying the stator structure configuration as disclosed by Nitta et al. The Examiner then refers to the Wendt et al. reference as disclosing that electrically insulated lacquered wire is widely used in the fields of electronics and telecommunications as well as in electric motors and transformers. Then, the Examiner concluded that it would have been obvious for one skilled in the art at the time the

invention was made to modify the Forbes et al. motor by employing the stator with lacquered copper wires as the stator winding.

The Examiner rejected Claim 7 under 35 U.S.C. § 103, as being unpatentable over Forbes et al, Nitta et al., and Wendt et al., and further in view of Nagasaki et al., U.S. Patent 6,127,760. The Examiner stated that the Nagasaki et al. reference disclosed a stator having closing rings on both top and bottom sides thereof and having a connecting end that integrally connects the closing rings. The Examiner concluded that it would have been obvious to one skilled in the art at the time that the invention was made to modify the prior art motor defined by the combination of Forbes et al., Nitta et al., and Wendt et al., by embodying the closing rings on both top and bottom sides thereof and having a connecting end that integrally connects the closing rings.

Before discussing the prior art relied upon by the Examiner, it is believed beneficial to first briefly review the structure of the invention of the subject Patent Application, as now claimed. The invention of the subject Patent Application is directed to a stator structure with composite stator windings. The stator structure includes a stator ring being formed by a plurality of units of equal size, each unit having a concave end on one end thereof and a convex end on another end thereof. The concave end has a shape complimentary to the convex end, wherein an assembled stator ring with respective concave ends engaged with respective convex ends cannot be separated in a lateral direction. Each unit of the stator ring has a plurality of angularly spaced embedding

grooves formed in one of an inner or an outer side thereof. The embedding grooves have an equal pitch. The stator structure includes a plurality of stator teeth respectively engaged with the stator ring. Each of the stator teeth is formed with an arch-shaped tooth surface and each stator tooth has a tooth flank extending from the distal end to a tooth tail at an opposing end of the tooth. The tooth tail has a complimentary contour to a contour of a respective embedding groove such that the tooth tail is firmly embedded into the embedding groove. The stator structure includes a plurality of insulating stages mounted on the stator teeth. Each insulating stage has a hollow post on which a winding is mounted. The post is disposed on a respective tooth flank of a corresponding tooth. The stator structure includes a plurality of insulating plates adapted to be coupled to proximal ends of the posts subsequent to the mounting of the winding on the post. Each winding is made of a lacquered copper wire conductive coil individually and separately wound and then subsequently mounted on the insulating stage for increasing an occupying ratio of the composite stator windings. The winding has a hollow center and the post of a respective insulating stage is embedded into the hollow center.

The stator teeth of the structure may have a pair of closing rings respectively disposed on a top side and bottom side thereof. The closing rings having connecting ends for coupling to adjacent closing rings. The closing rings are integrally connected by the respective connecting ends, whereby a plurality of stator teeth are secured together in a closed contour for respectively receiving the plurality of insulating stages on the stator

teeth combined with the closing rings and then receiving the windings on the insulating stages as a subassembly. The subassembly is subsequently joined to the stator ring by respective coupling of the tooth tails with the embedding grooves.

The structure of the invention of the subject Patent Application provides a unique stator arrangement wherein the winding coils can be prewound and subsequently installed on the insulating stages. That is made possible by the inclusion of the insulating plates which are adapted to be joined to the proximal end of the post portion of the insulating stage subsequent to the mounting of the coil thereon. By that arrangement, the coils can be prewound separate and apart from the insulating stage and/or the stator teeth, making both the manufacture of the coils and the assembly of the stator more efficient. Further, the ability to wind the coils separate from their bobbins and/or stator teeth allows the composite stator winding to have a greater "occupying ratio" with respect to the available winding space. Further, through use of closing rings disposed on the top side and bottom side of the stator teeth, wherein the closing rings have connecting ends for coupling adjacent closing rings together, an integral subassembly of stator teeth is able to be formed upon which the insulating stages and windings can be mounted prior to the joining of the stator teeth with the stator ring. Thus, the subassembly may be assembled and tested (in a configuration that is more accessible) and then subsequently joined with the stator ring to form the composite stator of the invention of the subject Patent Application.

In contradistinction, the Forbes et al. reference is directed to a salient pole core for a dynamo-electric machine. The machine 31 includes a stator 35 having a plurality of salient pole pieces 57 each are provided with integral extensions 65 for respective engagement with the plurality of notches 45. Each salient pole piece 57 carries a bobbin 69 on which a winding 67 is formed. The bobbin 69 includes a pair of spaced apart opposing flanges 75, 75A integrally formed thereon. Thus, the winding 67 must be wound onto the bobbin, rather than preformed and subsequently assembled thereto, as in the invention of the subject Patent Application.

The Nitta et al. reference fails to overcome the deficiency of Forbes et al. The Nitta et al. reference is directed to an electric motor having a split stator core, each core including a yoke section and a plurality of salient poles on which windings are wound respectively. The split stator core 1 comprises a plurality of cores 2, each including a yoke section 3 and three salient poles 4a to 4c extending from the yoke section 3. Windings are "wound on the salient poles 4a to 4c of each unit core 2", column 4, lines 11-16. Nowhere does the reference disclose or suggest an arrangement wherein the windings can be prewound and then subsequently installed on the stator teeth by means of insulating stages and insulating plates which are joined together subsequent to the windings being installed on the posts of the insulating stages.

The Wendt et al. reference does not overcome the deficiencies of Forbes et al. combined with Nitta et al. The Wendt et al. reference is directed to a hardenable

polyurethane composition for coating electrical wires. Nowhere does the reference disclose or suggest an arrangement wherein the coated wire can be preformed in a coil and then subsequently installed on the post of an insulating stage mounted on a stator tooth, prior to that stator tooth being joined to a stator ring.

Whereas in the invention of the subject Patent Application, the structure of the stator ring having embedding grooves and stator teeth having tooth tails for respective engagement with the embedding grooves provides a structure wherein an insulating stage can be installed on the stator tooth prior to the stator tooth's engagement with the stator ring. By the structure of the insulating stage being joined to an insulating plate subsequent to the preformed winding being installed on the insulating stage, the remaining structural element necessary for permitting the utilization of preformed coils, coils which are formed separate and apart from any bobbin or stator tooth, is provided. Therefore, the combination of Forbes et al., Nitta et al., and Wendt et al. cannot make obvious the invention of the subject Patent Application, as now claimed.

With respect to Claim 7, neither Forbes et al., Nitta et al. nor Wendt et al. discloses or suggests a structure wherein each stator tooth includes a pair of closing rings respectively disposed on a top side and bottom side thereof, the closing rings having connecting ends for coupling adjacent coupling rings together. By that arrangement, the closing rings are integrally connected together so that the plurality of stator teeth are secured together in a closed contour for respectively receiving the plurality of insulating

stages on the stator teeth combined with the closing rings. Thus, the hollow post of the insulating stage receives the tooth flank of the stator tooth and the corresponding portions of the closing rings therein, with each post receiving a corresponding winding thereon and an insulating plate, so that a subassembly is formed. The subassembly is subsequently joined to the stator ring by respective coupling of the tooth tails of the plurality of stator teeth with the embedding grooves of the stator ring.

The Nagasaki et al. reference does not overcome the deficiencies of Forbes et al. combined with Nitta et al. and Wendt et al. The Nagasaki et al. reference is directed to a direct-current motor which includes a core having a plurality of teeth arranged in a circular disposition to define a plurality of slots into which coils are wound. The stator core 1 is covered with two insulating end plates 8 and 9 at both end sides thereof, as shown in FIG. 5. Each of the insulating end plates is made from an insulating synthetic resin and form first and second slot insulating portions 6 and 7 upon which the windings are wound, column 5, lines 13-54. Thus, rather than define closing rings having respective connecting ends by which the plurality of stator teeth are secured together in a closed contour to form a subassembly that can then be assembled to the stator ring, as provided in the invention of the subject Patent Application, the structure of Nagasaki et al. describes an insulating arrangement installed on the integral stator structure upon which the windings can be wound. That structure is essentially the same as the embodiment of Nitta et al. shown in Figure 16 of that reference.

Thus, the combination of Forbes et al, Nitta et al, Wendt et al. and Nagasaki et al. cannot make obvious the invention of the subject Patent Application as now defined in Claim 7.

For all the foregoing reasons, it is now believed that the subject Patent Application has been placed in condition for allowance, and such action is respectfully requested.

Respectfully submitted,

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